ACUTE LEUCÆMIA IN CHILDHOOD.

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Acute leucæmia, while a rare disease in adult life, is still more so in childhood. Classing as acute only those cases in which the duration of the disease is not over nine weeks, I have been able to find, in a pretty careful review of the literature of the subject, but seven cases reported. In view of these facts, therefore, even a single case seems worthy of detailed description. My own case is as follows:

Mary K., aged three, was seen by me but once. Her mother had died of pneumonia a year previously. Her father was well. There was no tubercular or syphilitic history. She was healthy at birth. She was nursed for a year, and then fed from the table. She was always subject to diarrhœa, but had been otherwise well. For family reasons she had been put out to board six weeks before. At that time she was well. She was found the day before in her present condition. No history could be obtained except that six days previously red spots had come out on the skin, and the mouth had become sore. She had also vomited blood, and had passed some blood from the bowels.

PHYSICAL EXAMINATION.—Seriously sick. Fairly developed and nourished. Very pale. Gums swollen, spongy, and bleeding. Tonsils large. Throat reddened. Systolic murmur over præcordia. Lungs normal. Abdomen lax. Edge of liver felt about one inch below costal border, sharp. Spleen palpable below rib border, three inches in breadth and two inches in length. Slight general glandular enlargement. Numerous petechiæ over legs and abdomen. No evidences of rickets. No tenderness about joints or swelling over long bones. Temperature normal.

BLOOD.—Hæmoglobin, - - 25 per cent.
Red Corpuscles, - - 2,024,000.
White Corpuscles, - 87,400.
Lymphocytes, - - 83 per cent.
Large Mononuclear, - - 11 per cent.
Polynuclear Neutrophiles, 5 per cent.
Eosinophiles, - - - 1 per cent.

Slight variation in size of reds, almost none in shape. No nucleated forms. No myelocytes.

Fresh liquid diet, lemon-juice and stimulation were ordered. The child was not seen again, but died a week later. The bleed-

ing from the gums and bloody stools continued, and the purpuric eruption increased. There was no autopsy.

In the light of the above history and blood examination there can be no doubt as to the correctness of the diagnosis of acute leucæmia in this case. If the history can be accepted as correct, the onset was acute with subcutaneous hæmorrhages and bleeding from the gums, and the duration of the disease only two weeks. Owing to the circumstances of the child's surroundings, however, it is possible that these marked symptoms may have been preceded for a time by others less noticeable. The child was, without question, well when it was put out to board, so that the duration, in any case, can not have been more than seven weeks. Although the grandular enlargement was not marked, while that of the spleen was considerable, the great bulk of the white corpuscles was made up of lymphocytes. The large mononuclear forms were also somewhat increased in number. The case must therefore be regarded as a mixture of the lymphatic and lienal varieties, although mainly of the lymphatic type.

The cases which have been previously reported are briefly as follows:

I. Wadham—Age, five and a half years. Always well except for chronic hypertrophy of tonsils. Illness began with pain in belly, constipation, cough and sleeplessness. When seen at the end of six weeks had lost much strength and was very pale. The tonsils and glands at the angles of the jaw were enlarged. There was no enlargement of the liver or spleen. There were no hæmorrhages at any time. Death occurred after two weeks of progressive failure.

The autopsy showed petechiæ in all the internal organs and in the eyes. The mesenteric glands were as large as walnuts. The liver showed numerous minute, opaque, yellowish-white spots, and weighed one pound and ten ounces. The spleen showed yellow infarcts, and weighed five ounces.

The blood, which was examined a few days before death, showed a proportion of three white corpuscles to one red.

II. Eichhorst—Age, eight years. Always healthy. Illness began acutely with precordial pain and the vomiting of large quantities of blood. This was followed by marked anæmia and ascites. The physical examination, made ten days later, showed no evidences of bleeding from the mouth or throat; tonsils normal; no glandular enlargement; spleen much enlarged, liver slightly; ascites; hydrothorax; marked anæmia; bloody diarrhœa and vomiting of blood began the next day, and continued

until death, four days later; there were no ecchymoses, and the temperature was only slightly elevated.

The autopsy showed a large spleen; thrombosis of the portal vein; an ulcerated area at the cardiac end of the stomach—the source of the hæmorrhage; slight enlargement of the mesenteric glands; normal bone-marrow.

The blood on the eleventh day showed 25 per cent. of hæmoglobin, 1,000,000 red corpuscles and 88,000 whites. The reds showed no marked changes at this time. Degenerative changes were more marked on the fourteenth day, however, although there were no nucleated forms. The colorless corpuscles were about the size of the reds; no eosinophiles.

III. Müller—Age, four years; always healthy except for meningitis at three; illness began with cough and fever, which only lasted a week or so; loss of weight and color continued, however. At the end of a month, headache, sleeplessness, belly-ache, constipation and nose-bleed began; physical examination at this time showed ulceration of throat; large glands in neck, but none elsewhere; moderate splenic tumor; slight enlargement of the liver; numerous large subcutaneous hæmorrhages; staphylococcus infection of the throat; vomiting of blood; bloody stools; temperature ranging about 40°; death in five days.

The autopsy showed hæmorrhagic diphtheritic inflammation of the fauces and larynx; universal parenchymatous lymphadenitis; hæmorrhages into skin, pericardium, indocardium, stomach and testicles; parenchymatous nephritis and hepatitis; diphtheritic enteritis; fatty degeneration of the myocardium; general anæmia; general infection with staphylococci and bacilli.

The blood was examined on the four days preceding the day of death. The first examination showed 40 per cent of hæmoglobin, 1,508,000 red corpuscles and 109,600 white. There were no very marked changes in the red cells. The differential count of the whites showed:

Lymphocytes, - - - - -	12 per cent.
Large and medium-sized mononuclear cells without granulations, - - - - -	85 per cent.
Polynuclear Neutrophiles, - - - -	2 per cent.
Eosinophiles, - - - - -	1 per cent.

The last examination showed 1,232,000 red cells and only 6,800 whites. Of these a few were lymphocytes, scarcely any large mononuclear, most polynuclear neutrophiles or eosinophiles. Müller attributes the changes in both the absolute and relative numbers of the white corpuscles to the acute staphylococcus infection.

IV. Müller—Age, four years; always healthy; illness began with malaise and pains all over; after four weeks a purpuric eruption appeared about the knees; progressive increase in sev-

erity of symptoms during the next two weeks, and hæmorrhage from the throat began. At this time there was marked swelling of the cervical glands, the spleen was distinctly palpable, and the liver reached four fingers' breadth below the costal border. The subcutaneous hæmorrhages increased in size and number, and the hæmorrhage from the throat continued; progressive failure and death in four days; no autopsy.

Several examinations of the blood, made during the last four days, gave almost identical results. They showed 25 per cent.–30 per cent. of hæmoglobin, 2,350,000 red corpuscles and 209,000 white. As in Müller's other case, the bulk of the white corpuscles was made up of large mononuclear cells with a large, round, feebly-staining nucleus, poor in chromatin, and a small amount of protoplasm. The differential count showed 16 per cent. of lymphocytes, 82 per cent. of large mononuclear and 2 per cent. of polynuclear cells. The red corpuscles showed no marked changes.

V. Goldschmidt—Age, two and a half years; always healthy; illness began with enlargement of cervical glands lasting two weeks. Two weeks later the glandular enlargement recurred and was accompanied by swelling of the tonsils and high fever. During the next week the spleen enlarged rapidly, and the liver could be felt two fingers' breadth below the costal border. The urine showed evidences of nephritis and the blood of leucæmia. Failure was progressive, except for a temporary amelioration of a few days, and death occurred in three weeks.

The autopsy showed general glandular hyperplasia; great enlargement of the spleen; moderate of the liver; nephritis. Bacteriological examination of the organs was negative.

The blood, microscopically, showed a great increase in the number of white corpuscles, especially of the lymphocytes. Eosinophiles were few and nucleated reds rare. The bacteriological examination of the blood was negative.

VI. Theodor—Age, four years; parents syphilitic; placenta syphilitic; always well; illness began with a very severe nose-bleed following a fall from a horse; ecchymoses had been noticed on the legs for two weeks, however. Slight splenic tumor was noticed two days later, and the proportion of red cells to white was then estimated as nine to one. Five days later the spleen was much enlarged, and enlargement of the cervical glands was noted. Renal hæmorrhage began and lasted eight days. The glands and spleen increased in size; the liver did not enlarge. There was bleeding of the gums, and numerous subcutaneous hæmorrhages developed. The temperature was never above 38°. Failure was progressive, except for a temporary remission, and death occurred four weeks after the fall; no autopsy.

The blood, shortly before death, showed one white cell to three red. An overwhelming proportion of the white corpuscles

were lymphocytes. There were a few large mononuclear cells with a large, feebly-staining nucleus, some polynuclear leucocytes and a very few eosinophiles. The changes of severe secondary anæmia gradually developed in the red corpuscles. Cultures from the blood were sterile.

VII. Cabot—Refers to a case of Dr. F. C. Shattuck's, in which the blood was examined by Thayer. Age, infant. Duration, six weeks.

BLOOD.—White to red, as one to twenty.

Lymphocytes, - - -	97.9 per cent.
Large Mononuclear, - -	0.4 per cent,
Polynuclear Neutrophiles, - -	1.4 per cent.
Eosinophiles, - - -	0.1 per cent.

It is manifestly impossible to generalize from so small a number of cases. A certain number of conclusions do, however, seem justifiable. There is no evident general aetiological cause. The disease sometimes begins abruptly with typical leucæmic manifestations and sometimes with general indefinite constitutional symptoms which, in the course of days or weeks, develop into the characteristic picture of leucæmia. The course of the disease in children is not different from that in adults. In children, as in adults, acute leucæmia is usually of the lymphatic type. The blood differs in no essential particular from that of the disease in adults. Acute leucæmia in children is always fatal.

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